BEFORE THE STATE OF WASHINGTON

ENERGY FACILITY SITE EVAUATION COUNCIL

In the Matter of Application No. 2003-01: SAGEBRUSH POWER PARTNERS, LLC; KITTITAS VALLEY WIND POWER PROJECT	EXHIBIT 29 (WE-T)

APPLICANT'S PREFILED DIRECT TESTIMONY
WITNESS #10: WALLY ERICKSON

Q Please state your name and business address.

A My name is Wally Erickson and my business address is 2003 Central Ave, Cheyenne, WY 82001.

Q What is your present occupation, profession; and what are your duties and responsibilities?

A I am employed by Western EcoSystems Technology Inc (WEST). WEST provides environmental consulting services to organizations such Zilkha Renewable Energy. We assist those organizations in analyzing environmental impacts of projects such as the Kittitas Valley Wind Power Project ('Project'). I am a biostatistician and Project Manager for WEST. My

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duties regarding this Project were to oversee the wildlife impact assessment portion of the project, including the design and implementation of baseline studies. I assisted in the preparation of the Application for Site Certification for this Project.

Q Would you please identify what has been marked for identification as Exhibit 29-1 (WE-1).

A Exhibit 29-1 (WE-1) is a résumé of my educational background and employment experience.

Q Are you sponsoring any portions of the "Application for Site Certification" and "Clarification Information Provided to EFSEC Independent Consultant for EIS Preparation", for the Kittitas Valley Wind Power Project?

A Yes. I am sponsoring the following sections for which I was primarily responsible for the analysis and development:

Section 1.4.2.4 Mitigation for Operations Impacts to Plants and Animals

Section 3.4.3 Wildlife

Clarification Information Section 3.4.3.5 Potential Wildlife Impacts

Section 3.4.4 Fisheries

Section 3.4.5 Unique Species

Section 3.4.6 Wildlife Migration

Clarification Information Attachment 7

Section 3.4.7 Potential Effects of Decommissioning and/or Cessation of Project

Section 3.4.8 Proposed Mitigation Measures for Potential Impact to Plants and Animals

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Q What exhibits that are part of the Application that you are sponsoring?

A I am sponsoring the following exhibits to the Application.

Exhibit 11 Wildlife Baseline Study

Exhibit 12 Biological Assessment for Endangered, Threatened, Proposed & Candidate Species

Q Are you familiar with these sections of the Application and Exhibits?

A Yes

Q Did you prepare these sections and exhibits, or, if not, did you direct and /or supervise their preparation?

A Yes.

Q Is the information in these sections and exhibits within your area of authority and /or expertise?

A Yes

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Q Are the contents of these sections and exhibits of the Application either based upon your own knowledge, or upon evidence, such as studies and reports as a reasonably prudent persons in your field and expertise are accustomed to rely in the conduct of their affairs?

A Yes.

Q To the best of your knowledge, are the contents of these sections and exhibits of the Application true?

A Yes.

Q Do you incorporate the facts and content of these sections and exhibits as part of your testimony?

A Yes.

Q Are you able to answer questions under cross examination regarding these sections and exhibits?

A Yes

Q Do you sponsor the admission into evidence of these sections and exhibits of the Application?

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A Yes

Q Are there any modifications or corrections to be made to those portions of the Application that you are sponsoring?

A Yes.

There is currently a habitat conservation plan (HCP) being developed for potential impacts to bald eagles from the project. Through approval of the HCP, the USFWS can issue an incidental take permit for possible take of bald eagles from the Project. The original application included a biological assessment, in the event that Section 7 of the Endangered Species Act was applicable. Since there is currently no federal nexus with the project and therefore Section 7 consultation does not apply, the biological assessment in Exhibit 12 is being used to assist in preparation of the HCP and the Section 10 permit application. The overall purpose of the habitat conservation planning process (Section 10 of the ESA) is to provide a means by which the USFWS can issue an incidental take permit to non-federal entities which authorizes the incidental take of threatened or endangered species from a project and not to permit or authorize the proposed project or activity which may lead to the take. In essence, Section 10 provides a means by which a private entity can legally conduct an otherwise lawful activity that may incidentally take a threatened or endangered species.

Q Would you please summarize and briefly describe the studies you conducted regarding wildlife, your assessment of the impacts of the project on habitat and wildlife, and mitigation features that are being proposed.

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A WEST designed and conducted the wildlife baseline studies for the Project. The wildlife portion of the ecological baseline study consisted of surveys of avian use, bald eagle surveys, aerial surveys for raptor nests, incidental observations of other wildlife. The methods for the surveys are similar to methods used at other wind power projects. Information on sensitive wildlife species that may occur within the vicinity of the Project was requested from the U.S. Fish and Wildlife Service (USFWS) and Washington Department of Fish and Wildlife (WDFW). The baseline avian use data, other existing information from this site, and existing information from other wind project sites was used to assess the potential impacts of the project on wildlife. The duration and scope of the baseline study was greater than the duration and scope of many studies of proposed wind projects in the U.S., was collected using similar methods used at other projects in the Pacific Northwest, and is consistent with the recommendations of the wind power guidelines developed by the Washington Department of Fish and Wildlife.

No threatened or endangered fish species are found on site, and no impacts to such species are expected from the project. Although estimated to be small, there is some likelihood of bald eagle mortality during the life of the project. The Applicant, under section 10 of the ESA, is developing a Habitat Conservation Plan (HCP) to acquire an incidental take permit for possible take of bald eagles. Section 10 of the ESA provides a means for private (non-federal) entities to acquire a permit for incidental take of listed species due to an otherwise lawful activity.

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Potential direct and indirect impacts of the Project such as bird and bat collisions with turbines, direct loss of habitat from the footprint of the Project, and potential displacement impacts were assessed.

Based on the available information from other projects, it is probable that some displacement effects may occur to the grassland/shrub-steppe breeding avian species occupying the study area. The extent of these effects is expected to be small (zero to several hundred feet) and would be consistent with effects from road development in general. Given the low raptor nest density near turbines, few, if any, breeding raptors are expected to be displaced.

Some bird and bat fatalities are anticipated from the Project. The impact analysis considered the three different scenarios for turbine sizes and numbers. Based on the avian use studies conducted at this site, and the results of studies at other projects, approximately 2 to 3 bird fatalities per turbine (for the range of turbine sizes, which may be utilized for the Project) per year are anticipated. A variety of species may be found as fatalities, and no individual species are expected to account for a large proportion of the mortality. No impacts to individual species populations are anticipated. Actual rates may be lower or higher, but the majority of raptor fatalities are expected to be american kestrels and red-tailed hawks, two very common raptor species. These fatality rates, or even significantly higher fatality rates, would not be expected to have population level consequences for the likely species impacted. It should be noted that the fatality estimates may vary from the expected range based on many factors, including turbine

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size and other site specific and/or weather variables. Monitoring data will provide direct measures to the mortality levels.

Based on the results of studies at other wind projects in the west, we expect approximately 2 bat fatalities per turbine per year, with most of the fatalities consisting of hoary and silver-haired bats. The significance of this impact is hard to predict since there is very little information available regarding bat populations. Studies do suggest that almost all of the mortality is observed during the fall migration and dispersal period. Furthermore, the hoary bat, which is expected to be one of the most common fatalities at this site, is one of the most widely distributed bats in North America. It should be noted that the fatality estimates may vary from the expected range based on many factors, including turbine size and other site specific and/or weather variables. Monitoring data will provide direct measures to the mortality levels.

Some displacement impacts to wintering big game may occur in the Project area, although significant amounts of human activity have already occurred within the Project area. Because disturbance levels will not greatly increase beyond what was observed pre-project, impacts are expected to be very low or non-existent. Construction impacts to wintering big game are expected to be low, given that most of the heavy construction such as road and foundation construction will occur outside the critical winter months.

Cumulative impacts of the three proposed projects in Kittitas County (Kittitas Valley, Desert Claim, and Wild Horse) were addressed in the Project's DEIS. The same cumulative impacts analysis is being used for the environmental impact assessments for

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the three projects. It was estimated that approximately 450 to 750 bird fatalities may occur if all three projects are built. Actual levels may be higher or lower, but the actual mortality rates are not expected to have any level of population consequences for individual species, due to the expected low fatality rates for individual species.

Using an approximate range of estimates from other operating wind plants in the west and mid-west (approximately 1 to 2 bat fatalities per turbine per year), annual bat mortality resulting from the three projects is expected to be approximately 400 to 800 bat fatalities per year. Actual levels of mortality could be higher or lower depending on regional migratory patterns of bats, patterns of local movements through the area, and the response of bats to turbines, individually and collectively.

Some temporary displacement of wintering mule deer and elk is anticipated from winter construction activities associated with the three proposed wind power projects. These temporary impacts may be higher if construction occurs simultaneously on two or all three of the projects since a larger area would be subjected to disturbances. Most heavy construction activities will occur outside the winter period. Also, the WH site and KV and DC sites may be far enough apart so that cumulative impacts from construction activities may not be apparent for big game. While human related activity at wind turbines during regular maintenance will be dramatically less than during the construction period, it is not known if human activity associated with regular maintenance activity will exceed tolerance thresholds for wintering mule deer or elk. If tolerance thresholds during regular maintenance activities are exceeded, some animals are likely to be displaced and utilize areas away from the wind project development areas. Given the amount of

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existing residential development and the existing roads and disturbance in the vicinity of the KVWP and DCWP projects, (e.g., half the roads in the KVWP project are existing roads that will be improved), disturbance levels during operation will not increase greatly.

The Applicant proposes several measures to minimize and mitigate impacts to wildlife. These include project design features, siting, and mitigation for habitat loss. Most of the electrical collection system within the Project site will be underground. The new overhead lines will be designed to minimize electrocutions and will be equipped with perch guards to deter raptors from perching near turbines. If guyed permanent meteorological towers are used, bird flight diverters will be installed to potentially reduce bird mortality from collisions with the wires. If guyed meteorological towers are used, these will be monitored for bird and bat fatalities as part of the operational monitoring program.

The Applicant proposes to develop a post-construction monitoring plan for the Project to quantify impacts to avian species and to assess the effectiveness of mitigation measures implemented. The monitoring plan will include the following components: 1) fatality monitoring involving standardized carcass searches, scavenger removal trials, searcher efficiency trials, and reporting of incidental fatalities by maintenance personnel and others; and 2) a minimum of one breeding season raptor nest survey of the study area and a 1 mile buffer to locate and monitor active raptor nests potentially affected by the construction and operation of the Project.

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The Applicant plans to convene a Technical Advisory Committee (TAC) to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. Proposed membership of the TAC will include representatives from EFSEC, Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service,, local interest groups (e.g., Kittitas Audubon Society), Project landowners, and the Applicant. The role of the TAC will be to review information regarding mitigation measures, studies to monitor impacts to wildlife and habitat, and address issues that arise regarding wildlife impacts during construction and operation of the wind plant. The post-construction monitoring plan will be developed by EFSEC, based on the recommendations and in coordination with the TAC.

Approximately 90 acres of habitat will be lost due to the footprint of the project. Another 310 acres will be temporarily impacted during construction. The Applicant proposes to purchase, enhance and protect, for the life of the Project, a large area of habitat on-site to mitigate for direct and temporary loss of habitat. This privately owned parcel, which is located in Sections 22 and 27, Township 19 North, Range 17 East, and is adjacent to land owned by the Washington DNR, is currently under threat of development. This parcel is approximately 550 acres in size. The mitigation parcel is suitable according to the WDFW. Using the WDFW guidelines, the Applicant would be required to mitigate for a maximum of 345 acres of suitable habitat. The mitigation parcel is approximately 550 acres, far exceeding the WDFW requirement for habitat mitigation.

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Wallace P. Erickson, M.S.

PRESENT POSITION

Biometrician/Project Manager
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PREVIOUS POSITIONS

1998-2000	Research Assistant, University of Wyoming.
1990-1991	Research Assistant, University of Wyoming.
1990-1991	Field Scientist, University of Alaska, Fairbanks.
1989	Research Assistant, Alumni Office, Winona State University.

EDUCATION

PHD	expected 2003	University of Wyoming	Statistics
M.S.	1992	University of Wyoming	Statistics
B.S.	1989	Winona State University	Statistics/Mathematics

RELEVANT EXPERTISE AND TRAINING

Generalized Linear Models	Logistic Regression
Sampling Theory	Multivariate Statistics
Experimental Design	Randomization/Permutation Tests
Spatial Statistics	Monte Carlo Methods (e.g., Bootstrap)
Non-Parametric Statistics	Geographic Information Systems
Resource/Habitat Selection	Good Laboratory Practices (GLP)
Wind Project Impacts	

SPECIALTY AREAS

Mr. Wallace P. Erickson has been a statistician/project manager with WEST since 1991. He has over 14 years of consulting experience related to the design and analysis of environmental and wildlife studies. His primary research interests include habitat selection methodology with applications to GIS, and study designs and analysis for detecting impacts from environmental perturbations. He has been lead statistician and WEST project manager for baseline studies, environmental permitting, and/or operational monitoring/research at over 20 wind energy projects in seven states (California, Minnesota, Montana, Oregon, Washington, West Virginia, Wyoming). He is an author/co-author on over 35 professional journal articles, book chapters or peer reviewed proceedings papers, and is co-author of the 2nd edition of the book "Resource Selection by Animals". He has presented over 20 papers/posters at national/regional meetings.

His duties with WEST Inc. involve using current state-of-the-art statistical principles in designing ecological studies and analyzing subsequent data. He has had extensive experience with most statistical computer packages, including SAS, SPLUS, SYSTAT, and SPSS, and in most relational database applications (e.g., ACCESS, DBASE). He also has experience with Geographical Information Systems, including ARCVIEW. He has taught workshops on the following topics: 1) Statistics for Spatially Correlated GIS Data, 2) Resource Selection, 3) Computer Intensive Statistics, and 4) Basic Statistics for Biologists and Field Ecologists. He is currently working on a Ph.D. in Statistics at the University of Wyoming. The topic of his dissertation is on methods for estimating wildlife fatality rates in field study situations.

SCIENTIFIC ORGANIZATION MEMBERSHIPS

American Statistical Association
Biometrics Society
The Wildlife Society
The National Audubon Society

PROFESSIONAL PUBLICATIONS/PROCEEDINGS

Johnson, G. D., M. D. Strickland, W. P. Erickson, and D. P. Young, Jr. 2003. In press. Use of data to develop mitigation measures for wind power development impacts to birds. In M. Ferrer, G. Janss and M. de Lucas, editors. Birds and windpower. Quercus Press, Spain.

Erickson, W.P., R. Nielson, R. Skinner, B. Skinner and J. Johnson. 2004. Applications of resource selection modeling using unclassified Landsat Thematic Mapper imagery In Resource Selection Technique and Applications. Huzurbazar, editor. Omnipress, Madison Wisconsin.

Howlin, S., W.P. Erickson, and R. Nielson. 2003. Techniques for assessing predictive ability of resource selection functions. In Resource Selection Technique and Applications. Huzurbazar, editor. Omnipress, Madison Wisconsin.

McDonald, L.L., J.R. Alldredge, M. Boyce and W.P. Erickson. 2003. Measuring availability and vertebrate use of terrestrial habitats and foods. In Wildlife Techniques Manual.

Manly, B.F.J., L.L. McDonald, D. Thomas, T. McDonald and W.P. Erickson. 2002. Resource Selection by Animals, Statistical Design and Analysis of Field Studies. Kluwer Academic Publishers.

Erickson, W.P. 2002. Bird mortality from anthropogenic causes. 2003. In Proceedings of the Wind Power 2002 Conference, Portland Oregon.

Erickson, W.P., G.D. Johnson, and D.P. Young. 2003. In press. Summary of anthropogenic causes of bird mortality. Proceedings of the 2002 International Partner's in Flight Conference, Monterrey, California.

Young, D., W. Erickson, M. Dale Strickland, Rhett Good, and S. Howlin. 2002. Comparison of avian effects from UV light reflective paint applied to wind turbines, Foote Creek Rim Wind Plant, Carbon County, Wyoming. National Renewable Energy Laboratory. Golden, Colorado 80401-3393

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2002. Collision mortality of local and migrant birds at a large-scale wind power development on Buffalo Ridge, Minnesota. *Wildlife Society Bulletin* 30:879-887.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2003. Mortality of bats at a large-scale wind power development at Buffalo Ridge, Minnesota. *American Midland Naturalist* in press.

Anderson, R., W.P. Erickson , M.D. Strickland, M Bourassa, J. Tom, and N. Neumann. 2001. Avian monitoring and risk assessment at Tehachapi Pass and San Gorgonio Pass Wind Resource Areas, California. Proceedings of the National Avian-Wind Power Planning Meeting IV. National Wind Coordinating Committee, c/o RESOLVE, Inc. Washington, D.C.

Strickland, M.D., W.P. Erickson, G. Johnson, D. Young, and R. Good. 2001. Risk reduction avain studies at the Foote Creek Rim Wind Plant in Wyoming. Proceedings of the National Avian-Wind Power Planning Meeting IV. National Wind Coordinating Committee, c/o RESOLVE, Inc. Washington, D.C.

Strickland, M.D., G. Johnson, W.P. Erickson and K. Kronner. 2001. Avian studies at wind plants located at Buffalo Ridge Minnesota and Vansycle Ridge Oregon. Proceedings of the National Avian-Wind Power Planning Meeting IV. National Wind Coordinating Committee, c/o RESOLVE, Inc. Washington, D.C.

Erickson, W.P., T.L. McDonald, K. Gerow, J. Kern and .S. Howlin. 2001. Statistical issues in resource selection studies with radio-marked animals. Pages 209-242 in J. J. Millspaugh and J. M. Marzluff, editors. Radio Tracking and Animal Populations. Academic Press, San Diego, California, USA.

Erickson, W.P., G. D. Johnson, M. D. Strickland, D. P. Young, Jr., K.J. Sernka and R.E. Good. 2001. Avian collisions with wind turbines: A summary of existing studies and comparisons to other sources of avian collision mortality in the United States. National Wind Coordinating Committee Publication. http://www.nationalwind.org/pubs/default.htm

Peterson, C. H., L. L. McDonald, R. H. Green, and W. P. Erickson. 2001. Sampling design begets conclusions: the statistical basis for detection of injury to and recovery of shoreline communities after the Exxon Valdez oilspill.. Mar Ecol Prog Ser 210:255-283.

Hupp, J. W., A.B. Zacheis, R.M. Anthony, D.G. Robertson, W.P. Erickson and Kelly C. Palacios. 2001. Snow cover and snow goose *Anser caerulescens caerulescens* distribution during spring migration. Wildlife Biology, 7(2): 65-76.

Arnett, E.B., R.J. Anderson, C. Sokal, F. Isaacs, R.G. Anthony and W.P. Erickson. 2001. Relationships between nesting bald eagles and selective logging in south-central Oregon. Wildlife Society Bulletin 29:795-803.

PROFESSIONAL PUBLICATIONS/PROCEEDINGS (continued)

Kern J.W., T.L. McDonald, S.C. Amstrup, G.M. Durner, and W.P. Erickson. Submitted Sept. 2000. Bootstrap estimates of utilization distributions using the fast fourier transform. Environmental and Ecological Statistics.

Irons, D.B., S.J. Kendall, W.P. Erickson, L.L. McDonald, and B.K. Lance. 2000. Nine years after the *Exxon Valdez* oil spill: effects on marine bird populations in Prince William Sound, Alaska. The Condor. 102: 723-737.

Erickson, W.P., M.D. Strickland, G.D. Johnson, and J.W. Kern. 2000. Examples of statistical methods to assess risk of impacts to birds from windplants. Proceedings of the National Avian-Wind Power Planning Meeting III. National Wind Coordinating Committee, c/o RESOLVE, Inc., Washington.

McDonald, T. L., W. P. Erickson, and L.L. McDonald. 2000. BACI analysis for count data. JABES. 5:262-279.

Strickland, M.D., D.P. Young , Jr., G.D. Johnson, W.P. Erickson, and C.E. Derby. 2000. Wildlife monitoring studies for the SeaWest Wind power Plant, Carbon County, Wyoming. Proceedings of the National Avian Wind Power Planning Meeting III. National Wind Coordinating Committee, c/o RESOLVE, Inc., Washington, D.C.

Strickland, M.D., G.D. Johnson, W.P. Erickson, S. Sarappo, and R. Halet. 2000. Avian use, flight behavior and mortality on the Buffalo Ridge, Minnesota Wind Resource Area. Proceedings of the National Avian Wind Power Planning Meeting III. National Wind Coordinating Committee, c/o RESOLVE, Inc., Washington, D.C.

Ward, D.H., R. A. Stehn, W. P. Erickson,and D. V. Derksen. 1999. Response of fall-staging brant and Canada geese to aircraft overflights in Alaska. J. Wildl. Manag. 63:382-391.

Erickson W.P., G. D. Johnson, M. D. Strickland, and K. Kronner. 1999. Avian baseline study at the proposed CARES Windplant, Goldendale WA. NREL/SR-500-259.

Erickson, W.P., T. Nick and D.H. Ward. 1998. Investigating flight response of brant on the Izembek NWR, Alaska, using logistic regression techniques. in "Statistical Case Studies: A Collaboration Between Academe and Industry". eds, R. Peck, L.D. Haugh, and A. Goodman ASA/SIAM, Philadelphia, PA pp. 155-171.

Erickson, W.P. T. McDonald, and R. Skinner. 1998. Habitat selection using GIS data: A case study. JABES. 3: 296-310.

Strickland M.D., Johnson, G.D., W. Erickson, S. Sarappo and R. Halet. 1997. Assessing impacts to birds from the Buffalo Ridge, Minnesota windplant development. Proceedings from the American Wind Energy Association Conference, June 15-18, in Austin TX. Pp. 281-290.

Johnson, G., D. Young, W. Erickson, and D. Strickland. 1996. Assessing river habitat selection by waterfowl wintering in the South Platte River, Colorado. Wetlands. 16: 542-547.

Highsmith, R.C., T.L. Rucker, M.S. Stekoll, S.M. Saupe, M.R. Lindeberg, R. Jenne and W.P. Erickson. 1996. Impact of the *Exxon Valdez* oil spill on intertidal biota. In Rice, S. D., R. B. Spies, D. A. Wolfe, and B. A. Wright (eds). *Exxon Valdez* Oil Spill Symposium Proceedings. American Fisheries Society Symposium Number 18.

Stekoll, M.S., L. Deysher, R.C. Highsmith, S.M. Saupe, Guo, W.P. Erickson, L.L. McDonald and M.D. Strickland. 1996. Coastal habitat injury assessment: intertidal communities and the *Exxon Valdez* oil spill. In Rice, S. D., R. B. Spies, D. A. Wolfe, and B. A. Wright (eds). *Exxon Valdez* Oil Spill Symposium Proceedings. American Fisheries Society Symposium Number 18: 177-192.

Erickson, W. P., and L.L. McDonald. 1995. Tests for bioequivalence of control media and test media in studies of toxicity. Journal of the Society of Environmental Toxicology and Chemistry. 14:1247-1256.

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Marr, J.C.A., H.L. Bergman, M. Parker, J. Lipton, D. Cacela, W. Erickson, and G.R. Phillips. 1995. Relative sensitivity of brown and rainbow trout to pulsed exposures of an acutely lethal mixture of metals typical of the Clark Fork River, Montana. Can. J. Fish. Aquat. Sci. 52: 2005-2015.

McDonald, L. L. M.D. Strickland and W. P. Erickson. 1995. Coastal Habitat Injury Assessment: Design, Analysis and Statistical Inference. In *Exxon Valdez Oil Spill:* Fate and Effects in Alaskan Waters. P. G. Wells, J. N. Butler, and J.S. Hughes, eds. ASTM STP 1219, Atlanta, GA.

McDonald, L.L. and W.P. Erickson. 1994. Testing for bioequivalence in field studies: Has a disturbed site been adequately reclaimed. Proceedings of the Statistics in Ecology and Environmental Monitoring Conference. pp. 183-197.

McDonald, L. L., D. J. Reed, and W. P. Erickson. 1991. Analysis procedures for habitat and food selection studies. In Proceedings 4th North American Caribou Workshop. [eds. C. E. Butler and S. P. Mahoney] Newfoundland and Labrador Wildlife Division, St. John's, Newfoundland. pp. 429-474.

PAPERS PRESENTED AT REGIONAL AND NATIONAL MEETINGS

Erickson, W.P. Update on Bird and Bat Mortality and Risk at wind projects. Paper at the 2003 Biological Significance Workshop, NWCC Wildlife Working Group, Washington, Washington, D.C. November 2003.

Erickson, W.P. Bird mortality at wind projects. Invited paper at the 2002 American Bird Conservancy Policy Council Meeting, Washington, D.C. December 2002.

Erickson, W.P. Bird Mortality at Wind Projects and from Other Anthropogenic Sources. Invited paper at the 2002 Minnesota Ornithological Union Conference, Minneapolis, MN. December 2002.

Erickson, W.P. Avian collisions with wind turbines: a summary of existing data and a comparison to other sources of bird mortality. Contributed paper at the Windpower 2002 Conference, Portland, OR, June 2002.

Erickson, W.P. Summary of anthropogenic causes of avian mortality. Invited paper at the 2002 International Partner's In Flight Meeting, March, 2002. Monterrey, California.

Erickson, W.P. Avian collisions with wind turbines. Invited paper at the International Conference on Utility Structures, March, 2002. Fort Collins, Colorado.

Erickson, W.P. Avian mortality from anthropogenic causes. Invited paper at the Washington State Audubon Meeting, September 2001, Walla Walla, WA.

Erickson, W.P. Statistical methods for estimating wildlife fatality rates. 2001 TWS Meeting, Reno, NV.

Erickson, W.P. Modeling moose habitat. January 2000. Workshop organizer and presenter for state and federal agency personnel in Alaska.

Erickson, W.P. 1999. Statistical issues in resource selection studies. Invited paper presented at the symposium "Modeling Species Occurrences", Snowbird, UT.

Erickson, W.P. 1999. Statistical issues in resource selection studies with radio-marked animals. Invited paper in the radio-telemetry session at the Wildlife Society Meeting, Dallas TX.

Erickson, W.P., October 1999. Use Of GIS in monitoring impacts of windplants on wildlife. Invited paper presented at the EPPL7 User's Conference, St. Paul, MN.

Erickson, W.P., and M.D. Strickland. 1997. Assessing Impacts to Birds from the Buffalo Ridge, Minnesota Windplant Development. Invited paper presented at the AWEA Meeting, Austin, TX.

Erickson, W.P., M.D. Strickland, G. Johnson, and J. Kern. 1998. Examples of Risk Assessment Methods for Studying Impacts of Birds from Windplants. Invited paper presented at the NWCC Meeting, San Diego, CA.

Erickson, W.P. and M.D. Strickland. 1997. Assessing impacts to birds from the Buffalo Ridge, Minnesota Windplant Development. Invited paper presented at the AWEA Meeting, Austin, TX.

Erickson, W.P. 1997. Resource selection techniques with GIS data. Invited talk presented at the BLM/DU Satellite Imagery Conference, Anchorage, AK.

Erickson, W.P. 1997. Design and analysis issues when assessing environmental impacts to wildlife populations. Invited talk at Winona State University, Winona MN.

Erickson, W.P. 1997. Statistical considerations in observational field studies: What can you infer? Invited paper at the Northwest Chapter of the Wildlife Society Meeting, Sun River, Oregon.

Erickson, W.P. and T. McDonald. 1996. Resource selection techniques using GIS. Poster presented at the National Wildlife Society Meeting in Cincinnati, OH.

Erickson, W.P. and T. Nick. 1996. Investigating flight response of brant on the Izembek NWR, Alaska, using logistic regression techniques. Poster presented at the ASA meeting in Chicago.

Erickson, W.P., November 1995. Habitat selection by moose on the Innoko National Wildlife Refuge in West-Central Alaska. Invited paper presented at the EPPL7 User's Conference, St. Paul, MN.

Erickson, W.P., M.D. Strickland and L. Sharp. September 1995. Experimental design for the study of wind power effects on wildlife. Poster presented at the National Wildlife Society Meeting in Portland, Oregon.

Erickson, W.P. and L.L. McDonald. July 1995. Practical aspects of adaptive sampling. Invited paper presented at the Western North American Region of the Biometrics Society, Stanford, CA.

McDonald, L.L. and W.P. Erickson. November 1994. A shift in paradigm for statistical analysis in risk assessment. Paper presented at the Society of Environmental Toxicology and Chemistry, Denver, CO.

Erickson, W. P. November 1994. An approximate solution to the Behran-Fisher's problem with application to NRDA and toxicity testing. Paper presented at the Society of Environmental Toxicology and Chemistry, Denver, CO.

Erickson, W. P.and L. L. McDonald. November 1992. Formulations of hypotheses of assumed effect in bioassay. Paper presented at the Society of Environmental Toxicology and Chemistry, Cincinnati, OH.

SELECTED TECHNICAL REPORTS

Erickson, W.P., J. Jeffrey, K. Bay and K. Kronner. 2003 Wildlife Monitoring for the Stateline Wind Project. Results for the Period July 2001 – December 2002. Technical report prepared for the Stateline Technical Advisory Committee and the Oregon Office of Energy.

Johnson, G.D., W.P. Erickson, M.D. Strickland, K.J. Sernka, K. Kronner, and B. Gritske. 2003.Analysis of potential avian/wind plant interactions in Klickitat County, Washington: Supplement to the Klickitat County Energy Overlay Programmatic Environmental Impact Statement. In review draft. Klickitat County Resource Development Department, Goldendale, WA.

Johnson, G.D., W.P. Erickson, and J. White. 2003. Avian and bat mortality at the Klondike, Oregon Phase I Wind Plant. Technical report prepared for Northwestern Wind Power by WEST, Inc.

Johnson, G.D., M.K. Perlik, W.P. Erickson, M.D. Strickland, D.A. Shepherd, and P. Sutherland, Jr. 2003b. Bat interactions with wind turbines at the Buffalo Ridge, Minnesota Wind Resource Area: An assessment of bat activity, species composition, and collision mortality. Electric Power Research Institute, Palo Alto, California and Xcel Energy, Minneapolis, Minnesota. In Press.

Erickson, W.P., G. D. Johnson, D. P. Young, Jr., M. D. Strickland, R.E. Good, M. Bourassa, K. Bay. 2002. Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments. Technical Report prepared for Bonneville Power Administration, Portland, Oregon.

Erickson, W.P. 2002. Statistical issues and procedures to consider in resource selection studies involving GIS and in wildlife mortality estimation. Prepared for Ducks Unlimited Inc., Rancho Cordova, CA 95670-6116, Project No. AK-0037-001-001.

WEST, Inc. and Northwest Wildlife Consultants, Inc. 2002. Ecological baseline study for the Zintel Canyon Wind Project. Technical report prepared for Energy Northwest.

WEST, Inc. and Northwest Wildlife Consultants, Inc. 2002. Final Report, Avian Baseline Study for the Maiden Wind Power Project, Yakima and Benton Counties, Washington. April-October 2001. Technical report prepared by Western EcoSystems Technology, Inc., Cheyenne, Wyoming.

WEST, Inc. and Northwest Wildlife Consultants, Inc. 2001 and 2002. Baseline ecological studies for the proposed Klondike wind project, Sherman County, Oregon.

WEST, Inc. and Northwest Wildlife Consultants, Inc. 2001. Wildlife baseline study for the Nine Canyon Wind Project. Technical report prepared for Energy Northwest.

Erickson W.P., G. D. Johnson, M. D. Strickland, and K. Kronner. 2000. Avian and bat mortality associated with the Vansycle wind project, Umatilla County, Oregon,1999 study year. Technical report prepared for Umatilla County Department of Resource Services and Development, Pendleton, Oregon.

Erickson, W.P. and E. Callahan. 1998. Sample size, power and design for study to re-visit PFC sites. Technical report submitted to Dynamac Corporation, 2275 Research Blvd., Rockville Maryland.

Johnson, G.D., D. Young, W.P. Erickson, C. Derby and M.D. Strickland. 2000. 1995-1999 Wildlife monitoring studies, SeaWest Windpower Plant, Carbon County, Wyoming. Technical Report submitted to SeaWest Energy Corporation and Bureau of Land Management.

Skinner, R., W. Erickson, G. Minick, and L.L. McDonald. September 1997. Technical Report. Description and location of habitat using resource selection techniques and other statistical tools. Innoko NWR: U.S. Fish and Wildlife Service Technical Report.

Skinner, R. W. Erickson, and J. Minnick. September 1997. Estimating moose populations using line transect sampling. Innoko NWR: U.S. Fish and Wildlife Service Technical Report.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M. Shepherd, and D. Shephard. 2000. Avian Monitoring Studies Buffalo Ridge, Minnesota Wind Resource Area. Technical Report Submitted to Northern States Power Company, Minneapolis, Minnesota.

Erickson, W.P., L. Sharp, J. Brauner, and M.D. Strickland. 1997. Avian Baseline Studies for the Vansycle Ridge Wind Project. Technical Report Submitted to ESI Corporation.

Erickson, K.M., W.P. Erickson, and L.L. McDonald. 1994. Review of methods for estimating population abundance of migratory populations. Technical Report submitted to Dave Ward, NBS, Anchorage, AK.

Erickson, W. P. and L.L. McDonald. December 1993. Response of brant and other geese to aircraft disturbances at Izembek lagoon, AK - reanalysis of experimental overflight data. Technical Report to Dave Ward, U.S. Fish and Wildl. Serv., Anchorage, AK.

Erickson, W. P., L. L. McDonald, and A. H. Wheeler. December 1992. Analysis of data on raptor species from the Black Butte Coal Company study report 1986 and recent unpublished studies (1986-1990). Technical Report for Kiewit Mining Group Inc. and Black Butte Coal Company.

Highsmith, R.C., M.S. Stekoll, W.E. Barber, L. Deysher, L. McDonald, D. Strickland and W.P. Erickson. 1994.

Comprehensive assessment of coastal habitat, *Exxon Valdez* oil spill Coastal Habitat Study No. A. Final Report. School of Fisheries and Ocean Sciences, University of Alaska, Fairbanks.

McDonald, L.L., W.P. Erickson, and J.H. Kern. 1994. Statistical results concerning subspecies limits and geographic patterns of morphological variation of California Gnatcatchers (Polioptila californica). Technical report submitted to the U.S. Fish and Wildlife Service as part of the public record in decisions under the ESA.

McDonald, L.L., D.L. Thomas, W.P. Erickson, H.O. Krueger, B.H. Stanley, and J.D. Wetherington. 1995. Use of experimental designs in terrestrial field studies. Wild-West Technical Report 95-1, West, Inc., 2003 Central Avenue, Cheyenne, WY 82001 and Wildlife International, Ltd., 8598 Commerce Drive, Easton MD 21601.

SELECTED WORK EXPERIENCE

2003-Present	National Park Service, Alaska. Assist in development resource selection models for songbirds and moose for National Park in Alaska.
2002-Present	DEA/SeaWest. Provide statistical support on risk assessment at a wind turbine facility in Washington.
2003	Windtricity, Goldendale Washington. Provide statistical support on risk assessment at wind turbine facilities in Oregon and Washington.
2002-Present	Klickitat County, Washington. Provide statistical and biological support for baseline study and Programmatic EIS on a proposed energy overlay zone.
2002	Bonneville Power Administration. Provide statistical report summarizing the latest baseline and mortality data collected at existing and proposed wind projects.
2001-Present	Eurus Corporation. Provide statistical support on risk assessment at a proposed wind turbine facility in Oregon.
2002	URS Corporation. Provide statistical and biological support for a supplemental EIR for a Solano County, CA wind facility.
2002-Present	RES. Provide statistical support on risk assessment at wind turbine facilities in Oregon and Washington.
2002-Present	Enxco. Provide statistical support on risk assessment at wind turbine facilities in Oregon and Washington.
2001-Present	Xcel Energy. Provide statistical support for bat monitoring and research study at the Buffalo Ridge, Wind plant, MN.
2002	Aventis. Provide statistical support for study of the effects of a herbicide on non-target plant species for use in reregistration of the compound by EPA.
2002-Present	Northwestern Wind Power. Provide statistical support on risk assessment at wind turbine facilities in Oregon and Washington.
2002-Present	CH2MHILL/Cielo. Provide statistical support on risk assessment at a large proposed wind turbine facility in Washington.
2002-Present	CH2MHILL/Zilkha Renewable. Provide statistical support on risk assessment at a large proposed wind turbine facility in Washington.
2000-2001	National Wind Coordinating Committee. Develop white paper on putting avian mortality at windplants in perspective with mortality from other human-made structures.
2000-Present	Energy Northwest, Inc. Provide statistical support on risk assessment at wind projects in Washington.
2000-2001	SeaWest Inc. Provide statistical support on risk assessment at a proposed windplant near Condon, OR.
1999-2001	Versar Inc. Provide statistical support on a human health risk assessment near the Lowery Air Force Base in Denver, CO.
1999-Present	FPL Energy Inc. Provide statistical support on risk assessment at a large proposed wind turbine facility in Oregon.
2000-Present	Chugach National Forest. Develop predictive models for 4 moose forage species on the Kenai Peninsula and the Copper River Delta.
1999-2001	U.S. Forest Service. Provide statistical support on a study of marten habitat selection.
1999	EBA, Inc. Provide statistical support for study of the effects of a herbicide on non-target plant species for use in reregistration of the compound by EPA.
1999-Present	Chugach National Forest. Develop habitat selection models for brown bears on the Kenai Peninsula, Alaska to evaluate effects of human development on preference of habitats.

SELECTED WORK EXPERIENCE (continued)

1997-1999	U.S. Navy. Evaluate study design, power of statistical tests and conduct statistical analyses for assessing impacts of proposed helicopter operations on California gnatcatchers and Least Bell's vireos at Mirmar and Camp Pendelton in southern California.
1997- Present	National Renewable Energy Laboratory. Develop study designs and analyze subsequent data for assessing differential mortality between wind turbine types at the San Gorgonio WRA and the Tehachapi Pass WRA in California.
1996-Present	SeaWest Energy Corporation. Design and analysis of comprehensive studies investigating the effects of wind power development on wildlife species on sites in Wyoming.
1996-98	FMC Corporation, Philadelphia, PA. Developed comprehensive studies to monitor the impacts of a pesticide on bird populations in Canada, and analyze subsequent data.
1995-2001	Weyerhauser Forest Products. Design and analysis of studies investigating the effects of salvage logging and other logging practices on bird populations and amphibian populations in the Pacific Northwest.
1995-Present	USGS-BRD, Anchorage, AK. Design and analysis responsibilities for various studies involving Pacific brant, at both their staging area at Izembek Lagoon, AK, and their wintering areas in Mexico.
1997-99	National Renewable Energy Laboratory. Develop study designs and analyze subsequent data for assessing mortality rates on the proposed CARES wind development near Goldendale Washington.
1996-2000	Northern States Power Company. Develop comprehensive monitoring plan, conduct field work, and analyze and report subsequent results for studying the effects of the Buffalo Ridge windpower site in southwestern Minnesota.
1992-2002	Innoko Wildlife Refuge, AK: Statistical consulting on moose survey and habitat mapping. Consulted on the design and analysis of four aerial surveys (March 1994, 1996, 1998, 2000) of moose using line transect methodology on the Innoko Wildlife Refuge, McGrath, Alaska. Develop resource selection functions and habitat maps from vegetation data collected from satellite imagery and GIS.
1997-99	Biological Reseach Division, USGS, Anchorage, AK. Assist biologist in developing habitat selection models for snow geese in Alaska.
1997-98	American Cynamid. Confidential risk assessment study.
1998	Dynamac Corporation, Rockville, MD. Design sampling protocol for re-visiting BLM wetland sites over entire western US. Investigated power and sample size issues.
1997	USFWS, Anchorage, AK. Analyze contaminant data collected from organs of captive and wild spectacled eiders.
1996-97	National Biological Service, Ft. Collins, CO. Assist biologist in analysis of National Hunting and Fishing Survey.
1995-97	Union Pacific Resources. Design monitoring study and analyze subsequent data for reclamation of a pipeline in Southwest Wyoming and Utah.
1995-97	National Science Foundation. Collaborate with an academic statistician (Dr. Todd Nick, University of Mississippi Medical Center) on logistic regression problem. Paper presented at the 1996 American Statistical Association meeting in Chicago.
1994-96	Kenetech/U.S. Windpower. Design and analysis of comprehensive studies investigating the effects of wind power development on wildlife species on sites in Wyoming, Washington, and Oregon.
1994-96	Chevron Land and Development Company. Review of data and analyses used to determine subspecies differences on a potential listed bird species.
1989-95	State of Alaska/U.S. Forest Service: Design and Analysis of the Coastal Habitat Injury Assessment Project for litigation concerning the *Exxon Valdez* oil spill in Alaska. Developed and administered standard operating procedures for field work, lab work, and data analysis.
1994	U.S. Fish and Wildlife Service, Anchorage Office. Develop procedure for estimating numbers of brant passing through an area on their migratory routes.
1992-94	Camp Dresser and McKee: Design and Analysis of Comprehensive Study of South Platte River near Metro Wastewater Reclamation District. Developed and administered standard operating procedures for fish and waterfowl surveys to study the habitat use and dissolved oxygen relationships for mitigation of alterations to the river.
1992-94	State of Montana: Design and Analysis for NRDA project along Mining Impacted River in Montana. Developed and administered standard operating procedures for field work, lab work, data analysis and quality control/quality assurance.

SELECTED WORK EXPERIENCE (continued)

1992-94	Miles Corporation: Analysis of Avian data from various pesticide field studies. Assisted in standard operating procedures and the protocol for pesticide terrestrial field study. Analyzed data and prepared reports for three different field studies under GLP.
1993	U.S. Fish and Wildlife Service, Anchorage office: Response of brant to aircraft disturbance. Analyzed response data collected in Izembek Lagoon for Pacific Brant.
1993	WY Game and Fish Department, Cheyenne, WY: Black-footed ferret survival analysis. Analyzed data to assess the effects of radio-collars on black-footed ferret reintroduction into the Shirley Basin.
1993	Greenfalk Consulting Inc., Boise ID. Statistical Workshop. Presented a week long statistical workshop for a group of biologists.
1992-93	City of Los Angeles: Support for Litigation. Contact for statistical expertise in law suit over potential environmental damage to river near Los Angeles, CA.
1989-91	U.S. National Park Service, Anchorage, Alaska: Survey of Dall sheep in Wrangel-St. Elias National Park. Analyzed aerial survey data to estimate abundance of Dall sheep in Wrangel-St. Elias National Park.
1991-92	California State Water Resources Control Board: Formulation of test of hypotheses for treatments that yield adverse effects.
1992	Kiewit Mining Company, Sheridan WY: Evaluation and analysis of mining impacts on raptors. Analyzed data involved mining impacts on the occupancy and reproduction success of raptors in Sweetwater County, WY.
1992	Miles Corporation: Power simulations for field studies. Simulated power for standard statistical tests used to assess impacts of pesticides on non-target wildlife.
1992	Wildlife International: Power simulations for field studies and literature review. Simulated power for standard statistical tests used to assess impacts of pesticides on non-target wildlife. Reviewed the literature for methods to combine results for independent studies and evaluated their use in application to the pesticide field studies.
1990-91	University of Alaska/Fairbanks: Field Scientist collecting intertidal data for the Coastal Habitat Injury Assessment Project for litigation concerning the Exxon Valdez oil spill in Alaska.
1990	U.S. Fish and Wildlife Service, Anchorage, Alaska: Computer Simulation work in designing U.S.-U.S.S.R. walrus surveys in the Bering and Chukchi Seas.